

I. Development of a Buyout Business Plan for the Southeast U.S. Commercial Shark Fishery

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II. Abstract

Funds were provided to the Gulf & South Atlantic Fisheries Foundation, Inc. to assess the feasibility of a buyout program within the commercial shark fishery of the Atlantic United States. Four individual contracts were awarded to assess the necessary components of the buyout, including: (1) socio-economic impacts to shark-dependent communities, (2) management, policy and resource analysis, (3) calculation of fair-market value for a shark permit and/or vessel, and (4) the development of the Buyout Business Plan. Each component of the Business Plan was successfully completed.

Using primary (industry survey) and secondary data, fishing dependent communities were described and an index of vulnerability computed to assess if these communities would be negatively impacted by a buyout. For most of the selected communities, it was found that an adverse impact would result from a buyback within the shark fishery. This impact would also have a geographic/regional effect since Florida accounts for the majority of shark landings.

Several methods were used to assess the fair market value of a shark vessel and/or permit. Underlying weaknesses precluded the use of any one method, but recent buyback scenarios within other fisheries favored an assessment at a range of annual gross revenues for all species landed by a vessel. Analysis of primary and secondary data allowed for a range of annual gross revenues to be calculated for participants within the shark fishery. The resulting analysis method was found to be the most appropriate and endorsed the use of a production-normalized value assignment/bid submission approach.

An industry survey allow for the collection of a variety of social and economic data; an estimated value for a vessel and permit was also calculated and included in the survey. Survey data indicated that ~70% of fishermen supported the buyback of shark permits and/or permits and vessels, that there was some

willingness from a majority of fishermen to accept the estimated value of a vessels (ranging from \$10,000 to over \$450,000), and that most (70%) fishermen rejected the estimated value of a permit (ranging from \$500 to \$20,000).

To estimate the number of full-time shark fishing vessels necessary to harvest the total allowable catch of the shark resource in one calendar year, an assessment of the current fishing fleet was conducted. An analysis of fleet characteristics (catch and fishing effort) indicated that approximately 21 directed shark fishing vessels (standardized by length and fishing power) and 96 indirect vessels could harvest a 2.25 million pound total allowable catch in about 270 days.

The Business Plan developed during this project included a variety of options that would reduce fishing effort within the shark fishery. Because the total allowable catch of the fishery is low, the fishery cannot generate sufficient funds for a significant removal of effort (assuming an industry financed buyback program). Hence, the options included in the Business Plan focused predominately on the removal of shark fishing permits (both incidental and directed). One option was included in the Business Plan that would allow for the removal of vessels and permits. Many assumptions were associated with the development of the Business Plan and should be thoroughly considered prior to implementing a buyout scenario.

To gain insight from industry about the acceptance of options included in the Business Plan, a direct mail survey was conducted. Incidental and directed shark permit holder received a package that included: an overview of the project, the options included in the buyout, a comment sheet, a postage-paid return envelope, and a copy of the Draft Buyout Business Plan. Of the 541 mailings that were sent, 74 comment sheets were returned. The majority of respondents did not support the options listed within the Buyout Business Plan ("None of the above" option). We believe that the majority of negative responses were based on the options included in the Plan.

An evaluation of industry comments (either written or verbal) received on the Draft Buyout Business Plan indicated that the options included in the plan were perceived as non-feasible. To increase the effectiveness of the buyback (from both a perceived and realistic standpoint), a more comprehensive buyback should be considered, one that includes increased payment for a shark permit or a vessel and all fishing permits (including shark). Because many participants (almost all) in the shark fishery are dependent upon other fisheries for revenue, a comprehensive buyback targeting a vessel and all associated fishing permits would eliminate substantial capitalization within many commercial fisheries of the Atlantic United States. If other fisheries were included in the buyback, it would increase the total funds available for an industry financed buyback. However, funding from public (appropriation from U.S. Congress) or private programs would increase the overall effectiveness of a buyout.

III. Executive Summary

To increase profits, allow for a year-round directed shark fishery, and to conserve the shark resource, commercial shark fishermen approached the Gulf & South Atlantic Fisheries Foundation, Inc. (Foundation) to assist in the development of a feasible plan to reduce effort through a buyback program. After a series of planning meetings, the Foundation prepared a Request for Proposals (RFP) to solicit outside expertise in the development of a Buyout Business Plan. The RFP was distributed to a variety of individuals and institutions throughout the Southeastern United States. From responses received, four contracts were executed, each focusing on a different objective of the Buyout Business Plan – (1) socio-economic impacts to shark-dependent communities (Independent Contractor; M. Jepson), (2) management, policy and resource analysis (Hanan and Associates, Inc.; F. Hester, R. Hudson, D. Hanan), (3) calculation of fair-market value for a shark permit and/or vessel (University of Florida; S. Larkin and C. Adams), and (4) the development of the Buyout Business Plan (Louisiana State University; W. Keithly). All contractors were successful in completing their individual projects.

To assess the socio-economic impact of a buyout, primary (industry survey – see below) and secondary (permit, landings and U.S.Census) data were utilized. Baseline community profiles, derived through secondary data, were created for each of the major communities where shark is landed. These profiles were used to assess the context for considering a buyout of the shark fishing industry. Using an index of vulnerability comprised of various measures of socio-economic well-being, the selected communities were rated in terms of their ability to withstand adverse impacts from a buyout. Most of the selected communities would be considered vulnerable to adverse impacts that might accrue from a buyout. Although permitted vessels are scattered throughout both the Gulf and Atlantic coasts (Maine to Texas), most landings are reported from the state of Florida. Therefore, a buyback within the shark fishery would have a disproportionate effect on Florida fishing communities.

Insured value, comparable sales value, future income stream value, 1-year of gross revenue, and an assigned value per linear foot of total vessel length were all methods used to assess fair market values of shark fishing vessels. However, none of these methods were used to compute fair market value based on weaknesses inherent with each method. Utilizing information derived from similar buyout scenarios in the northwest U.S., acceptable bid values were computed for vessels using a multiple-range of annual gross revenues for all species landed by the vessel. To compute this value for the shark fishery, a list of federal shark permit holders in the U.S. Gulf of Mexico and Atlantic regions were obtained, along with specific catch histories (all species) for each permit holder. Values were developed for each permit holder utilizing the bid-to-annual gross revenue ratios (the value for shark permit ranged from \$500-\$20,000; the value for a vessel and all fishing permits ranged from \$10,000 to about \$450,000). These values were incorporated into a industry survey to allow for an assessment of willingness to accept an estimated bid.

An industry survey was conducted by Jepson and Larkin and Adams to collect primary data from shark fishermen. The survey instrument collected a variety of social and economic data, but was also meant to collect data related to the buyback and any knowledge or willingness to participate. 605 federal shark permit holders were mailed surveys. A 58% response rate was achieved. Approximately 70% of respondents were in favor of a buyout of either vessels and/or permits but were unwilling to pay a tax to fund such a program. However, 70% rejected the estimated permit value as an acceptable buyout payment while approximately 60% of respondents indicated at least some level of willingness to consider the estimated amount as an acceptable buyout payment for the vessel and all permits.

An analysis of the commercial shark fishing fleet was conducted to estimate the number of vessels required to harvest the total allowable catch of the large coastal shark resource for most of a calendar year. Of the total universe of shark permit holders, 126 vessels caught 85% of the annual quota in only a

few weeks of fishing. Within the group of 126 vessels, 47 were identified as core vessels that depend on large coastal shark for at least half their total landings and landed 50,000 lb whole weight large coastal shark during the period of study. Through an analysis of the fishing fleet, vessels were standardized by length and fishing power. If the total number of shark fishing vessels were reduced through an industry buyout, about 21 standard Class III shark boats (longline vessels 42-54 ft in length) could take the current quota (2.2 million pounds dressed weight) in about 270 days.

Because of issues surrounding latent effort, coupled with the small government loan the fishery could support during an industry financed buyback, the options included in the Buyout Business Plan focused primarily on the removal of shark fishing permits. These options included: (1) receive \$500 for an incidental shark permit and give up future rights to fish for shark, (2) receive \$2,500 for a directed shark permit and give up future rights to fish for shark, and (3) Receive \$2,000 for a directed shark permit and “buy down” to an incidental shark permit. However, to allow for a more inclusive option that would allow for the buyback of permits and vessels, a fourth option was included (4) a “blind, silent reverse auction”. The development of the Business Plan was based on many underlying assumptions. Prior to implementing a final option for capacity reduction within the fishery, these assumptions must be critically assessed to maximize the effectiveness of the program.

To gain insight from industry about the acceptance of options included in the Business Plan, a direct mail survey was conducted. The NMFS-SERO was petitioned for a list of active shark fishery permit holders (both incidental and directed). The resulting query of the available permits database returned 541 shark permits. Survey packages were mailed to each permit holder. Survey packages included: an overview of the project, the options included in the buyout, a comment sheet, a postage-paid return envelope, and a copy of the Draft Buyout Business Plan. Industry members were instructed to choose one of the options included in the Business Plan or a “None of the above” option and return the comment sheet by January 10, 2006; comment sheets were accepted up to May 2006. Of the 541 mailings that were sent, 24 were undeliverable (4%) and 74 comment sheets were returned (13.9% response rate). Industry supported each of the options included in the Buyout Business Plan, except the option to receive \$2,000 for a directed shark permit and “buy down” to an incidental shark permit. However, the majority of industry members supported the “None of the above” option (87.8% of respondents). From written comments and telephone conversations with industry, it is thought that the response rate is correlated with the perceived “feasibility” of the options included in the Buyout Business Plan, e.g., response rate was low because options were either not fully understood or perceived as “unfeasible”. Another factor thought to impact response rate was the timing of the survey and the number of surveys targeting shark fishermen.

Survey data and policy documents (Magnuson-Stevens act and NOAA publications) suggest that a buyback within the shark fishery is feasible. However, issues surrounding latent effort, financing, and continued research identifying how commercial fishing businesses fit into their communities need to be addressed. Of significance to fisheries managers and shark fishermen, is the apparent lack of funds generated by the commercial shark fishery to finance a buyback that would substantially reduce capacity. This would indicate that either a more comprehensive buyout is necessary, one that included other fisheries in which shark fishermen participate, and/or an alternative source of funding would need to be secured (U.S. Congressional Appropriation or public financing). Latent effort within the fishery is a significant concern. Of the directed shark permits that were active during the study period, approximately half reported limited or no landings. This suggests that if a buyback were to be effective, latent effort would need to be eliminated or restricted to decrease the likelihood of vessels becoming active after a buyback is implemented.

Results of the most recent large coastal shark stock assessment could further complicate a buyback within the shark fishery. The final SEDAR-11 Stock Assessment Report and Consensus Summary Report indicate that sandbar sharks are overfished and that overfishing is occurring. Sandbar sharks account for

~50% of the large coastal shark landings. Although implementation of revised management measures will likely not occur until 2008, the total allowable catch for large coastal sharks will likely be reduced, thereby decreasing the funds that could be used to implement an industry financed buyback within the shark fishery.

IV. Purpose

The commercial exploitation of the U.S. shark resource has a long history. The commercial fishery was established in the early 1900's to supply leather, fins, oil, and meat to a variety of user groups (NMFS 2005). When commercial quantities of vitamin A were found within shark liver oil (ca. late 1930's), the fishery expanded considerably (NMFS 2005). The fishery remained strong until the early 1950's when post-World War II technology allowed for the development of synthetic vitamin A through laboratory techniques (Otwell *et al.* 1985; NMFS 2005). The mass manufacturing of vitamin A quickly reduced the demand for sharks and landings declined (Otwell *et al.* 1985; NMFS 2005). It is assumed that the ex-vessel value of shark meat, leather, and fins remained low and that fishing for shark was economically unproductive when compared to revenues generated in other fisheries (NMFS 2005). It wasn't until 1964-1968 that shark landings began to rise (NMFS 2005). Although instigated by an increase in the price paid for leather, the shark fishery also expanded to act as a "nuisance" control to reduce attacks on mackerel fishing operations in and around the Florida Keys (Otwell *et al.* 1985). Shark landings again declined and corresponded with a reduction in ex-vessel value paid for shark leather (Otwell *et al.* 1985).

Conflicting reports in literature suggest that the fishery "developed rapidly" or "accounted for less than 25 full-time jobs in the state of Florida" in the late 1970's (Otwell *et al.* 1985; NMFS 2005). Whichever is true, the fishery did expand significantly by the mid 1980's. Much of this expansion was based on market factors, namely the increased demand and ex-vessel value paid for shark meat, fins, and cartilage. Because the shark resource was perceived to be underutilized, the federal government actively promoted the exploitation of the shark resource and greatly assisted in the development of new markets (e.g., funding of marketing and food development programs) (Personal communication, Mr. Robert Spaeth, Southern Offshore Fishing Association, Inc., Madeira Beach, FL, and Mr. Russell Hudson, Directed Shark Fisheries, Inc., Daytona Beach, FL; Otwell *et al.* 1985). During this time, U.S. fishermen increased capacity within the fishery to become more efficient at harvesting the resource; this included upgrades to vessels and gear. On-board handling techniques, were also developed during this time to increase the price paid for meat (Otwell *et al.* 1985).

Shark landings peaked in 1989 (NMFS 2005). Based on the life-history strategies of many shark species (low fecundity, long maturation period, and slow growth), five of the regional Fishery Management Councils solicited the Secretary of Commerce to develop a Shark fishery management plan (FMP) that would impose a variety of regulations limiting effort and reducing landings (Brewster-Geisz 2005). The FMP was finalized in 1993 and allowed NOAA Fisheries, Highly Migratory Species (HMS) Office, to manage all shark fishery resources under the auspice of the Secretary of Commerce (NMFS 2005).

The Gulf and South Atlantic commercial shark fishery is a unique fishery that encompasses all local shark species into one of four aggregate groupings, large coastal sharks, small coastal sharks, pelagic sharks and prohibited (no take) species. Each grouping, with the exception of the prohibited species, is regularly assessed through stock assessments; some species are assessed individually. Although exploitation rates differ for each of the aggregate groupings, large coastal sharks have consistently dominated commercial shark landings. Sandbar and blacktip sharks constitute the majority of landings for large coastal sharks (NMFS 2005).

Large coastal shark stocks were assessed in 1990, 1992, 1994, 1996, 1998, 2002, and 2006. The entire large coastal shark stock, and/or individual species contained within the group, have been classified as overfished or overfishing was occurring at some date, either historic or present. These results, lead to increased regulations aimed at limiting landings and effort within the fishery. Brewster-Geisz (2005) provides a detailed timeline of regulatory actions within the shark fishery (from 1993 until present) and the reader is directed to this publication for further information. Generally, restrictions have included catch quotas (often referred to as a "hard Total Allowable Catch"), trip limits, prohibited species,

prohibited gears, time-area closures, reporting requirements, minimum size limits, limited access, vessel monitoring systems, fishery observer coverage, and permit restrictions.

As regulatory restrictions increased, many fishermen that historically participated in the shark fishery refocused their efforts to other, more profitable fisheries while retaining their directed or incidental shark fishing permits (personal communication, Mr. Russell Hudson, Directed Shark Fisheries, Inc.), creating substantial latent effort within the fishery. While latent effort is a concern (e.g., inactive shark fishing permits), the shark fishery is still an established and prevalent fishery within the Atlantic United States.

To increase profits, allow for a year-round directed shark fishery, and to conserve the shark resource, industry members approached the Gulf & South Atlantic Fisheries Foundation, Inc. (Foundation) to assist in the development of a feasible plan to reduce effort through a buyback program. The objectives of this project were to:

1. Achieve the southeast region's shark fishery stock rebuilding goals by substantial reductions in fishing effort;
2. Formulate a mutually acceptable, fair, operationally sound and financially viable vessel buyout program; and
3. Minimize or mitigate the negative impacts of the vessel buyout program on dependent fishing communities of the region.

V. Approach

To facilitate the development of the Buyout Business Plan, Foundation staff convened a series of planning meetings with industry cooperators Mr. Robert Spaeth and Mr. Russell Hudson. The purpose of these meetings was to discuss project objectives and develop a Request for Proposals to solicit the assistance of outside expertise in the development of the Buyout Business Plan. The Request for Proposals (RFP) outlined four priority projects, including: (1) socio-economic impacts to shark-dependent communities, (2) management, policy and resource analysis, (3) calculation of fair-market value for a shark permit and/or vessel, and (4) the development of the Buyout Business Plan.

Prior to the start of contractor projects, industry cooperators sampled a limited number of fishermen (both directed and incidental shark fishermen) to gather comments relative to the development of the Buyout Business Plan and the formulation of options that would be accepted by a majority of fishermen. Comments were received through telephone interviews, person-to-person contact, and small group meetings. Because industry cooperators were based in Madeira Beach and Daytona Beach, FL, efforts focused disproportionately on soliciting comments from industry members in these areas. Although concerns may be raised as to how well these samples might represent the entire shark fishery (non-random sampling, limited in time and space), Madeira Beach is considered the center of directed shark fishing efforts and the state of Florida accounts for the majority of shark landings within the United States (Jepson 2005). As such, it was regarded that the diversity of comments received by those industry members solicited would represent the variety of views of the shark fishing fleet. Industry comments indicated there was interest in having both vessels and permits included in the buyback program.

The RFP was disseminated to a variety of groups and institutions throughout the southeastern United States. From received responses, the Foundation executed four contracts, each pertaining to one of the listed priorities.. Listed below are the contractors, the Principle Investigator(s), project objectives and a description of work methodologies:

Calculation of Fair Market Value -

University of Florida. Larkin, S.L. and C.M. Adams. *Assessing the fair market value of commercial shark permits and vessels in the Gulf of Mexico and Atlantic Regions.*

The objective of this project was to determine the “fair market” value of a commercial shark permit and/or vessel as perceived by its owner(s). This was achieved through the conduct of a literature review of past buyout programs, collection of vessel-level data, and the computation of a fair market value for representative shark permits and/or vessels. To gain further insight into the fair market values that a shark fisherman might accept during a buyback scenario, an industry survey was conducted in cooperation with Jepson (2005).

Several sources of information were sought to allow for a thorough review of literature surrounding buyback scenarios, including: peer-reviewed journal articles (e.g., Marine Resource Economics, Review of Agricultural Economics, American Journal of Agricultural Economics), regulatory reports (from nations worldwide, such as the National Marine Fisheries Service in the United States), publications by organizations (e.g., Food and Agriculture Organization of the United Nations, Pew Charitable Trust), and white papers from individuals with in-depth knowledge of specific buyout programs.

To determine “fair market value” of a vessel, historical landings were obtained for each shark fishing license holder. Staff at the NMFS-Southeast Regional Office (SERO) queried the database containing information from the Federal Permit Application for Vessels Fishing in the Exclusive Economic Zone. The query searched for “active” directed and incidental commercial shark permits (i.e., permits codes SKD, SKI, TSKD, TSKE; the latter correspond to ‘transfer’ permits). An active permit is one in which the annual license fee has been paid; it is not associated with whether or not the vessel is fishing. Each permit is associated with a unique vessel. For each vessel, all of the active permits for other federal fisheries were identified. Two separate searches (one on March 30 and the other on April 20, 2004) identified 605 vessels. A review of the associated owners revealed that 41 operations consisted of multiple (2-5) vessels.

The permit information discussed thus far corresponded to “active” directed and incidental shark permits only as recorded in the database on those two dates. It is possible that some other permit codes may correspond to fishing operations that would be eligible for a buyback program. For example, “expired” permits can be re-activated within a year; if these permits are associated with vessels that have been active in the fishery and only expired recently; they would need to be included in the evaluation of the fishery. Discussions with SERO staff indicated that the number of such permits is approximately 1% of the total on any given date. Similarly, “inactive” vessels can become active (those with valid permits can begin fishing) and thereby increase the amount of actual or potential effort in the fishery that needs to be determined for the purpose of examining commercial shark fishing capacity. Thus, any official preliminary analysis of this fishery for the purpose of devising an effort buyback program would need to include expired, renewal, inactive, transfer and active permits on the date the query is conducted.

Estimating the revenues generated by each permit for each vessel was the first step in the fair market value assessment. Prior studies suggested that, in some cases, fair market value for a vessel was roughly approximated by the average annual gross revenue. This value would provide a “starting point” for fair market assessment. In order to determine the annual revenues associated with each federal fishing permit, total annual revenues were needed by species for the most recent historical period that covered multiple years. Multiple years are considered important due to the variability that can characterize fishing stocks and socio-economic conditions that can

affect participation. A three-year period was used in this study because it corresponds with the number of years used in recent buyout programs.

Calculation of total revenues by vessel and species required use of multiple NMFS data sources, namely from the Southeast and Northeast Science Centers. This is because landings of species harvested in federal waters are reported in three distinct logbooks for the fisheries with permits. These logbook programs include: the pelagic longline data program for highly migratory species (HMS); the coastal fisheries data program for snapper/groupers, coastal sharks, and mackerel; and the Northeast groundfish logbook.

Ideally, the annual revenues would be calculated using intra-annual (monthly or quarterly) and regional data (to the extent possible) in order to account for seasonal and regional fish prices and individual fish weights (and yields) that can affect revenue estimates. Given that such precision is beyond the scope of this project, current local fish prices and weights are used in this analysis. All references to total revenue, gross revenue, and income in this paper refer to the dockside value of landings calculated with the numbers of fish landed or pounds landed, conversion factors as necessary, and prices reported on the logbooks. The annual landings and dockside values used in this report were obtained from NMFS, the value estimates were generated by NMFS staff. In doing so, the official NMFS landings conversion factors were utilized to ensure the appropriate prices (per pound of whole weight) were applied to the appropriate landings units (i.e., whole weight basis). This was done for all species reported across the suite of permits held by each vessel. As a result, a data set was created that contained landings and gross revenues associated with all species for all vessels that possessed an active directed or incidental shark permit.

A profile of the shark fishery was created by summarizing information on landings and associated total revenues for all vessels that landed any species in 2003. The sample was composed of 474 vessels that are holders of shark permits. Shark permits are classified as directed and incidental. The sample contained 197 directed shark permits and 317 incidental shark permits. Since the 605 total active shark permit holders collectively held an additional 3,080 federal permits, the shark fishery can be characterized as a multi-species fishery.

To further assess “fair market value”, all license holders were invited to participate in a survey by responding to a mailed questionnaire. The mail survey was sent to all fishermen who held a shark permit during April 2004 regardless of type of shark permit and whether or not they targeted shark. The survey questionnaire was developed in consultation with representatives of the commercial shark industry (i.e., the Directed Shark Fisheries, Inc. and the Southern Offshore Fishing Association, DSF and SOFA respectively) and was pre-tested by fishermen in the Daytona Beach and Madeira Beach areas.

The implementation of the survey followed a modified-Dillman Approach. In the case of surveys that were returned as undeliverable following the first mailing, internet searches were conducted to confirm the validity of addresses and obtain revised addresses from the U.S. Coast Guard Vessel title database. The survey protocol was submitted to, and approved by, the Institutional Review Board at the University of Florida.

To help explain survey responses with respect to valuation of their permits and/or vessels, data from the Southeast Regional Office (SERO) of NMFS were obtained on transfers of all shark permits and transfers of all permits maintained by SERO for all vessels with an active shark permit in April 2004. Some of these files contained a reported sale price for the permit. The data with this price information covers a five-year period beginning early 2000.

The SERO maintains hard copies of all permit applications by vessel and has an electronic list of vessels involved in transfers for different permit types; the electronic list is continually updated such that historic permit information cannot be easily obtained. From the hard copies it is possible to obtain information on the vessels involved in the transaction, the date the transfer was official, and the reported transaction price. Aside from information on shark permit transactions, the files were also queried to obtain information on transfers of any permits maintained by SERO for all vessels that held shark permits in April 2004.

Data on prices for commercial fishing vessels and permits from two different sources were also collected and summarized. These values provided some indication of the current values for vessels and permits in the market; however, they are not transaction prices. Data was gathered from East Coast Marine Brokers, a private broker site, and from National Fisherman, a commercial fisheries periodical (vessel and permit prices were taken from the May 2004 issues and the August 2004 issues).

To compute fair market values, information generated from the previous objectives and activities described above are used to draw conclusions about what vessel owners perceive is the “fair market value” of their assets. For example, the pros and cons of seven alternative approaches for estimating values of fishing assets are summarized. The preferred approach, and approaches that could be analyzed with available data (e.g., preferences of permit owners, historical landings, transfer information), are used to estimate asset values. The effectiveness of two specific buyout programs (i.e., purchase of shark permits only versus purchase of the vessel and all permits) are then discussed in light of the valuation results and the likely characteristics of such programs as dictated by current NMFS regulations as summarized under the first objective.

Fishing Community Socio-Economic Impact Analysis -

Jepson, M. (Independent Contractor). *Socio-economic and community profile for Atlantic and Gulf of Mexico shark buyout program.*

The purpose of this project was to aggregate and compile socio-economic data to provide a baseline for fishing communities having been identified as being dependent upon shark resources. This was achieved through an overview and description of the current fishery utilizing both primary and secondary data. An industry survey, conducted in cooperation with Larkin *et al.*, was conducted to collect primary data relative to individual social indicators and perceptions of the buyback. U.S. Census and shark permit and landings data were used to assess populations at the community level. An index of vulnerability was also computed to evaluate the impact that a buyout would have on shark dependent communities.

Secondary data were obtained from both the U.S. Census Bureau and National Marine Fisheries Service Southeast Region. Census data for selected communities were obtained from the U.S. Census Bureau American Factfinder website. Data for the years 1990 and 2000 were assembled and placed into tables to comprise a demographic profile of each community. Data were also collected at the county level to use in the creation of a vulnerability index which consisted of select variables for each community compared to the county and then scaled accordingly. Permit data were acquired for the year 2004 from the National Marine Fisheries Service, Southeast Region. Permit data were then assembled into tables by state and for the selected communities. HMS permit data were also acquired from their website to contribute to state profiles.

A mail survey was conducted with a list of 2004 permit owners acquired by Dr. Charles Adams and assembled by Dr. Sherry Larkin. The mail survey was constructed by Drs. Larkin, Jepson,

and Adams. Returned surveys were entered into a spreadsheet and the data were distributed to the researchers. Data analysis for this research was primarily descriptive in order to outline concerns of fishermen regarding the potential buyout. Several other questions on the survey provided a profile of the shark fishing industry and are detailed in the report.

Using both secondary and primary data, community profiles were created which provided a context for the buyout process and the potential impact to fishing dependent communities.

The community profiles from the most recent amendment to the Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks (HMS 2003) was used as a basis for selecting communities, although other communities were added based upon assessment by those knowledgeable with the industry at the time of this research. Profiles from documents describing fishing communities previously were reviewed for communities located in the Mid-Atlantic (McCay and Cieri, 2000) and from research conducted previously on HMS vessels (Wilson and McCay, 1998).

The profiles described here expand on previous descriptions to include data that were considered important social indicators and have been updated with the most recent census data. Permit data for vessels and dealers were also collected and assembled to profile participation in the industry.

Data at the census designated place level (CDP) are used for describing the demographic character of most communities. Where zip code level data only are available (NAIC employment figures), data are compiled for the all zip codes associated with each CDP. When using census data it is important to understand that certain qualification must be made; certain groups of people who have been difficult to contact are often underreported in census data. Commercial fishermen are part of that group as outlined in recent research by Kitner (2001). For that reason, it must be assumed that census data as it relates to fishing communities is suspect. As was pointed out in earlier research (Jacob et al., 2001) any attempt at quantifying employment or income from commercial or recreational fishing becomes problematic. Data may be suppressed or grossly underreported and therefore any description will miss important economic and social contributions of fishing related businesses.

At the same time, census data is the only demographic data that can be applied over large geographic areas, population ranges and timeframes. It is easily available and represents the most affordable alternative for describing any community at this time. Although these data are problematic, it can only be assumed that any underreporting is consistent across geographic area, population range and time. Although this situation is not ideal, by combining several different data from various sources, a general description of community and the fishing activity associated with it may be attained. Until more detailed ethnographic research that can examine the social and economic networks that exist in fishing communities can be undertaken, this general and often broad description of community will have to suffice.

Employment data collected by the Census Bureau were also used at the zip code level for these community descriptions. These data are taken from the County Business Patterns data that are collected on a different timeframe from the decennial census. Data for this description were collected in 1998 and 2001 representing the most up-to-date at the time. Again, it must be assumed for reasons stated earlier that these data are likely to underreport actual fishing employment. In addition, the category of fishing that is reported in the economic census does not include those individuals who report themselves as self-employed, which most commercial fishermen consider themselves to be. Therefore, employment figures from the Census Bureau again grossly distort the actual employment from commercial and recreational fishing. However,

these data do point to employment that is related to both commercial and recreational fishing and give some indication of their importance to the community when compared to the same data for other communities. It must therefore be assumed that employment is being underestimated evenly across communities.

Permit data for vessels and dealers was received from the NMFS SERO office in St. Petersburg and used to calculate the number of vessels with directed and incidental shark permits in July of 2004. The query was to identify active shark permits and produced a total of 590 records. These numbers vary from other datasets used by other contractors involved in the buyout program as the data change according to the date of the inquiry. These were the only permit files used for the community profiles.

Landings data in the form of a table listing total landings by community were provided by Larkin and Adams using the dataset compiled for them by NMFS SERO. Landings were for the year 2003 and were calculated by using vessel landings for that year and summed using the variable homeport as the community. Homeport was chosen as community because it was assumed that this is where most shark were landed; according to questions in the analysis of the survey this is the case for most permit holders. For those communities with less than 3 vessels, data are withheld due to confidentiality.

A vulnerability index table was created for each community which consists of selected quality of life variables from the census data. Those variables include: percent minority population; percent below poverty level; percent unemployed; percent high school graduate or higher; Median household income (dollars); percent owner-occupied housing units. These variables were compared to the same variables in their respective county for each community. If the percentage (within 0.5% either way) was greater than that for the county, the index scale score was -1, if the percentage was the same the scale score was 0 and if it was lower the scale score was +1 for the variables poverty level, minority population, unemployment. For the other variables the scale was reversed. The total of the scale scores represents the overall index score of vulnerability with a possible range from +6 to -6. Positive scores suggest less vulnerability while negative scores suggest more vulnerability to adverse impacts. A high vulnerability score for a community would indicate that residents may have difficulty adjusting to disruptions in their social or economic stability as their community may be economically depressed or not capable of offering a better quality of life.

Stock Assessment and Fishery Management Policy Analysis -

Hanan and Associates, Inc. Hester, F., R. Hudson, and D. Hannan. *Southeastern U.S. commercial shark fishery stock assessment and fishery management policy analysis.*

This project aimed to assess the current shark fishing industry and shark resource to determine the size of a fishing fleet that would harvest the total allowable catch over a one year period. This was accomplished through an analysis of the current shark fishing fleet including direct and indirect permits, the distribution of catch and effort, and the composition of catch.

Catch information for the study period came from the two logbook sets: Coastal Fishery and Pelagic Longline. The logbook data were valuable in providing information on vessel performance and catch rates. Quality control and quality assurance measures were implemented to assure that any obvious errors were identified and corrected.

The bottom longline fishery accounted for the majority of large coastal shark landings. To adequately assess an average shark fishing vessel, the analysis focused on this segment of the overall shark fisheries. To decipher which bottom longline trips were directed at sharks, they examined the distribution of shark trips, and how trips might be separated from trips that target other species. Approximately 190 different vessels that used bottom longline gear made at least one trip in the three-year study period (2001-2003). Of the vessels using bottom longline gear, 137 held directed shark permits. Only 126 of the 137 vessels landed more than 100 lbs (whole weight) of large coastal sharks. They considered trips landing more than 100 lbs (whole weight) to be directed shark trips.

When examining the length of trips landing more than 100 lbs of large coastal sharks, it was assumed that short trip duration would be a directed shark trip because of the perishable nature of the product. Approximately 85% of bottom longline trips landing 100 lbs or more of shark had trips that lasted four days or less. For this analysis, a shark trip was defined as being a trip of four days or less with at least 100 lbs of large coastal shark landed.

Representative vessels were then identified. Of the 137 vessels that hold directed shark permits, 54 vessels land less than 50% large coastal sharks (as compared to other species landed). Of the remaining 83 vessels, those that landed 50,000 lbs or more large coastal sharks during the three-year period were selected (two additional vessels were included with slightly less landings to increase sample size). Thus, forty-seven vessels remained and were selected to establish individual vessel classes and compare their fishing power with that of the whole fleet. The 47 vessels included in the analysis account for 71% of the total large coastal sharks landed during the study period.

Three measures were then identified as potential proxies for fishing performance, length, engine horse power, and hold capacity. When regressing these variables against landings per trip, length was the only parameter that showed a significant relationship to landings. Vessels were then divided into four possible classes of directed shark bottom longline vessels based on landings and length: Class I = <32ft, Class II = 32-41ft, Class III = 42-54ft, Class IV = >55.

Class III vessels are the most numerous and about equally distributed geographically and therefore were selected to represent the standard large coastal shark bottom longline vessel. All other vessel classes were standardized to Class III vessels. The catch capacity of the fleet was then computed using standardized Class III vessels (e.g., computing how many Class III vessels and trips it would take to harvest the large coastal shark Total Allowable Catch).

Development of the Buyout Business Plan -

Louisiana State University. Keithly, W.R.. *Business Plan for the Atlantic Shark Fishery*.

The primary goal of this project was to develop a buyback scheme compatible to the nuances associated with the shark fishery. This included a review of relevant literature, including, but not limited to, historical and ongoing buyback programs, project sub-contractor reports, federal regulations and guidelines, and compatibility of these regulations and guidelines with alternative buyback scenarios. Industry and NMFS personnel were also consulted to formulate a 'preferred' program and method for implementation of such a buyback program.

Although a variety of databases were requested for use during analyses (under the Freedom of Information Act), delays were encountered by contractors in the acquisition of data. These delays likely stemmed from the legality of releasing information that could be traced to individuals or corporations. To

keep data confidential, all contractors had to individually request data for use and follow necessary procedures (signature of confidentiality agreements that outlined the constraints of who could view data and how data could be presented; this action precluded data sharing among contractors). Data were not received by contractors until late 2004. All data were kept confidential during the duration of this program, and Foundation staff and industry cooperators were barred from viewing raw data or any data outputs that would link individuals/corporations to income revenues and/or catch histories.

Industry Mailings -

To disseminate the Buyout Business Plan to fishermen, the original project proposal outlined a series of public presentations and meetings to discuss proposed options with commercial shark fishermen and interested members of the fishing community. Comments and suggestions on how to improve the plan were to be compiled and used by the project cooperators to aid in the final revision of the Buyout Business Plan. Time limitations and the seasonal variability in fishing effort limited the ability of the Foundation and project cooperators to convene industry meetings. To facilitate input from industry and allow adequate time for a response to options included in the Buyout Business Plan, a survey was mailed to all shark fishermen (this survey was in addition to that conducted by Jepson and Larkin and Adams).

The NMFS-SERO was petitioned for a list of all active shark fishery permit holders, both incidental and directed. Staff from the NMFS-SERO queried the available permits database on November 30, 2005. The query returned 541 shark permits, and 20 lessees. Because the focus of this project was to receive comment from the owners of shark permits, lessees were not included in the mailing. Each shark permit holder received one complete survey package via U.S. Postal mail. Survey packages included: (1) a one-page overview of the project, (2) a synopsis of the options included in the Buyout Business Plan, (3) a copy of the Draft Buyout Business Plan, (4) a comment sheet, and (5) a self-addressed, postage-paid return envelope. Mailings were postmarked to permit holders on December 6-7, 2005.

The comment sheet included in the survey allowed fishermen to individually mark options included in the Business Plan which they supported. Options included: (1) receive \$500 for an incidental permit and give up future rights to fish for shark, (2) receive \$2,500 for a directed permit and give up future rights to fish for shark, (3) receive \$2,000 and be permitted to “buy down” to an incidental shark permit, (4) “Blind, silent reverse auction”, and (5) “None of the above”. Additional space was included on the comment sheet to provide for additional, handwritten comments. All comments were to be received by January 10, 2006. However, comments were accepted up to May 2006. All comments remained anonymous.

As outlined in the survey package, the Foundation’s Program Director, Mr. David Medici, was available to answer questions regarding the Buyout Business Plan. Six (6) industry members contacted the Foundation’s office directly. All conversations revolved around the history of the Buyback program and why the options included in the Buyout Business Plan were incorporated.

Project Management –

Principal Investigators:

Ms. Judy L. Jamison	Executive Director, overall administrative supervision
Mr. David Medici	Program Director, technical supervision

Foundation Staff:

Ms. Gwen P. Hughes	Program Specialist, contract administration
Ms. Charlotte L. Irsch	Grants/Contracts Specialist, contract administration

The Foundation's Executive Director, Ms. Judy Jamison, had ultimate responsibility for all administrative and programmatic Foundation activities, with oversight by the Foundation's Board of Trustees. She ensured progress of activities to meet project objectives and confirmed compliance of all activities with NOAA/NMFS guidelines. The Program Director, Mr. David Medici, was responsible for all technical aspects of Foundation projects and coordinated the performance activities of project personnel, including contractors. He also coordinate the survey package mailing, and prepared all operational reports concerning project performance.

The Grant/Contracts Specialist was responsible for maintaining general financial accounting of all Foundation funds including all Cooperative Agreements/Grants and contracts, as well as communicating with NOAA Grant Management personnel, and assisting auditors in their reviews. She conducted/documented internal and program (single and desk) audits, prepared backup documentation for fiscal audits, and drafted award extension requests. Ms. Irsch provided the Executive and Program Directors with projected budgets concerning program performance and ensured that these budgets adhered to the proposed budget. Finally, she prepared the annual administrative budget, NOAA Financial Reports, and confirmed compliance of all activities with NOAA/NMFS and OMB guidelines.

The Program Specialist was responsible for tracking programmatic activities, generating supporting documentation to assist in any and all programmatic audits, and coordinating program related workshops (Planning Meetings). She was also responsible for auditing and paying program related invoices. She processed requests for reimbursement to conform with federal guidelines and prepared and maintained all contracts and amendments.

VI. Findings

Each component of this project was successfully completed and culminated in the drafting of a Buyout Business Plan for the Atlantic United States commercial shark fishery. Listed below is the Executive Summary or Conclusion of each project with supplemental information on major findings. For additional information, contractor Final Reports are attached as appendices.

Calculation of Fair Market Value -

University of Florida. Larkin, S.L. and C.M. Adams. *Assessing the fair market value of commercial shark permits and vessels in the Gulf of Mexico and Atlantic Regions.*

The commercial shark fishery within the Gulf of Mexico and Atlantic region is recognized by fishery managers as being overfished and overcapitalized. The implementation of traditional management measures to address this issue have created significant uncertainty within the commercial fleet and appear not to have corrected the problems. Representatives of the

commercial shark fleet within the region have requested that federal fishery managers consider the development of a permit and/or vessel buyout program for the commercial shark fleet. It is hoped that this non-traditional approach to shark fishery management will allow latent effort to leave the fishery and provide for a more economically efficient commercial fleet to harvest shark in a long term, sustainable manner within the biological constraints (i.e., harvest quotas) imposed by management. Such a buyout program would likely require the issuance of a federal loan, to be paid back by those vessels remaining in the fishery. The loan amount would be determined, in large part, by the expected dockside value for shark throughout the duration of the loan. Once the number of permits and/or vessels to be removed from the fleet is determined, the question remains: is the loan amount enough to buy back those permits and/or vessels? The answer to that question would be linked directly to the perceived fair market value of commercial shark permits and/or vessels, and the owners' willingness to accept that value and leave the fishery.

The overall objective of this study was to estimate the fair market value of a commercial shark permit and vessel. This information would be necessary to ascertain the financial feasibility of a proposed buyout program. The specific sub-objectives of the study were to (1) conduct a literature review of past and present buyout programs to determine the role that fair market value assessment has played in buyout program design and development, (2) obtain the appropriate vessel-level data from industry and federal management sources that would allow the determination of landings and gross revenue profiles associated with commercial shark permits and/or vessels, and (3) compute the fair market value for commercial shark permits and/or vessels.

A list of all vessels with a federal shark permit of any type was obtained from the SERO of the NMFS. Landings and value data were obtained for these vessels from the NMFS Southeast Fisheries Center and NMFS Northeast Fisheries Science Center. These data allowed the development of landings and revenue profiles for commercial shark vessels within the region. The list of permits also provided the mailing list for a mail-out survey that was sent to all federally permitted shark vessel owners within the region.

Of the 605 active shark permits owners in April 2004, 249 were directed permits. These 605 permit owners collectively held 3,585 commercial fishing permits, indicating a high degree of participation in other fisheries. The majority of other permits were swordfish, Atlantic tunas, king mackerel, and Spanish mackerel. Thus, a permit only buyout program is likely to only have limited success (especially since some of these other permits are required in order to fish shark) and a vessel buyout program would need more funding that could be supported by the shark fishery (assuming the other species contributed sufficiently to total revenues). There is also an issue of latent effort to be addressed since only 517 of the 605 vessels reported any landings during the 2001-2003 period.

Of the 605 potential respondents, only 551 had valid addresses, which could be related to permit sales between the list date and the survey date. One key component of the mail survey asked respondents (commercial shark permit owners) to indicate their willingness to consider (a) helping to fund a buyout program through a subsequent long-run tax on landings, (b) selling their shark permit and their vessel with all permits, and (c) likelihood of accepting a given value (i.e., bid) for their shark permit and their vessel with all permits. The likelihood was solicited in quarter increments from 0% to 100% (i.e., would definitely accept the bid and retire assets).

Landings-based value offers were computed using the average of the two highest years shark revenues and total revenues across all species during the 2001-2003 time period for each vessel. If vessels only reported landings for one of three years, the value for that single year was assumed

to be the average. Total revenues were converted to expected bids using a model based on results of the recent Pacific Northwest groundfish buyback program (Larkin and Adams 2005; personal communication, Dr. Mike Grable, NMFS). The model explains 91% of the variation in bid ratios (e.g., $R^2 = 0.91$).

The model produced corresponding bids for the combined annual total revenues for all species ranging from just over \$15,000 to nearly \$456,500. Vessel owners with an average annual total revenue for all species below \$5,000 were assigned a bid value of \$10,000 (137 of 605 total vessel). Owners of vessels with total average annual revenues above \$456,500 (were assigned bid values equal to that average (values reached nearly \$1.6 million). These values would be paid for a vessel, any associated permits, and the price to scrap the vessel.

The shark revenues were converted to expected bids for surrender of their shark permit using the same formula for average annual shark revenues (based on the highest two of three years in this study period) ranging from \$1,000 to \$8,500. For permits with shark revenues below \$1,000, permit owners were assigned a bid value of \$1,000 if they had reported any shark landings during the three-year period (197 permit holders), or \$500 if they had not (207 permit holders). In some instances, the bid generated for shark permits exceeded the bid for all permits and the vessel. In such cases, the shark permit value was reduced to half the value presented for all permits and the vessel. For average annual revenues in excess of \$8,500, permit owners were assigned bid values (split equally across each value) of \$15,000, \$17,500, or \$20,000; higher values were presented to those with higher reported landings. The values were capped into these three groups to prevent the use of unrealistic values.

A total of 321 permits owners (58.3% of available population) responded to the survey. Among the respondents, 75% and 66% were willing to sell their shark permit and/or their vessel with all permits, respectively. When asked about their likelihood of accepting the landings-based offer presented to them, less than 30%, but more than 60%, were at least somewhat likely (i.e., indicated a 25% or higher percentage) to accept the bids for the shark permits and/or vessel and permits. Assuming an individual would accept the offered bid with a likelihood of at least 50%, a program to purchase only shark permits would cost \$414,500 (approximately 15% of the annual value of the fishery) and would eliminate 9.3% of the value of the fishery. A program to purchase vessels and all permits would cost \$50.3 million (approximately 60% of the annual value of all fisheries) but would eliminate 45.2% of the value of shark landings as reported annually from 2001-2003.

Fishing Community Socio-Economic Impact Analysis -

Jepson, M. (Independent Contractor). *Socio-economic and community profile for Atlantic and Gulf of Mexico shark buyout program.*

The report consists of a socio-economic profile of the Gulf and South Atlantic shark fishery and selected communities. Using both primary data, a mail survey, and secondary data (e.g., permit data, landings information and census data), baseline profiles of both the industry and selected communities are used to determine the context for considering a buyout of the shark fishing industry.

Using an index of vulnerability comprised of various measures of socio-economic well-being, selected communities are rated in terms of their ability to withstand adverse impacts from a buyout. Most of the selected communities would be considered vulnerable to adverse impacts that might accrue from a buyout and that these communities might not fare as well as the county,

overall, in terms of quality of life. Although shark fishing is only one resource that is available to fishermen, an increasing number of fisheries are being regulated through limited entry and other management actions. Hence, the ultimate methodology for the buyback might have a disproportionate effect on fishermen. If a buyback of permits is the only considered option, then a fisher might be able to reduce the impact to the community by focusing efforts on another marine resource and stay active within fisheries. If the buyout were to focus on a buyout of permits and vessels, fishers would be permanently retired as a result; this would likely increase the negative impact to the community. Whatever the final method used to remove capital from the fishery, it is recommended that other measures of social impact assessment be used to understand how communities will be affected (the age of shark fishermen and the ability to enter into/increase efforts in new fisheries).

Primary data were collected through a mail survey of vessel owners in 2004. These data were analyzed to understand concerns over a proposed buyout. Although permitted vessels are scattered throughout both the Gulf and Atlantic coasts (from Maine to Texas), most landings are reported from Florida. Permitted vessels are found in concentrated number in only a few communities on either coast including Port Salerno, Pompano Beach, Fort Pierce, Madeira Beach and Panama City.

The response rate to the survey was over 50% and the geographic distribution of responses was closely aligned to the actual distribution of vessel owners overall. In terms of their demographic profile, respondents to the survey were on average around 50 years old and most had fished commercially for a good part of their adult lives with an average of 28 years. Of those that fished shark routinely, they had done so on average for about 16 years. The majority of respondents had a high school degree or higher in terms of their education level. Almost 75% of respondents were married and most were likely to have households with dependents. With regard to ownership of their homes, nearly 85% of those who answered this question owned their homes and about 10% rent. Just over 72% of respondents had health insurance for themselves and slightly less had health insurance for their family. With regard to opinions toward different management, the majority of respondents did not support revoking unused permits. This may reflect the large number of permitted individuals who do not have shark landings. Over 70% support either buying back permits or both permits and vessels. Approximately that same percentage do not want to see existing regulations tightened.

The majority of shark vessel owners surveyed were in support of a buyout, but indicated they were unwilling to pay a tax to fund such a program. Because the revenues from the shark fishery are relatively low, there would be little money to buy vessels and therefore would have little impact on reducing capacity. Although there is support for a buyout of permits and vessels, some alternative source of funding would be needed to have the desired impact of reducing overcapacity within the fishery if it were based solely on shark revenues.

Stock Assessment and Fishery Management Policy Analysis -

Hanan and Associates, Inc. Hester, F., R. Hudson, and D. Hannan. *Southeastern U.S. commercial shark fishery stock assessment and fishery management policy analysis.*

Nearly 600 boats ranging in size from a 14 ft skiff to a 146 ft motor vessel hold federal Limited Access Permits for landing sharks taken from the U.S. Exclusive Economic Zone in the Atlantic, Caribbean and Gulf of Mexico. These fishing vessels are estimated by NMFS to take the current annual Total Allowable Catch of large coastal sharks in a few weeks of fishing during each trimester (four-month) open period. This report estimates the number of active boats needed to

match fleet size and therefore effort (expressed as fishing time) required to catch the Total Allowable Catch.

There are two types of shark Limited Access Permits: Directed and Incidental. Under current regulations, the directed permit holders are allowed to land up to 4000 pounds dressed weight of large coastal sharks per trip (some species in the complex are protected and not allowed to be landed). Incidental permit holders are allowed to land up to five large coastal sharks per trip.

In 2003, there were approximately 245 directed shark permits and 349 incidental shark permits extant. Most of the permitted vessels held federal permits to fish for other species as well as shark. This made it necessary to identify a “directed shark boat” and a “directed shark trip”. A directed shark boat was defined as holding an incidental shark permit, using bottom longline gear and having made at least one directed shark trip (a trip lasting 4 days or less and landing at least 100lbs whole weight of large coastal sharks) during the three year period (2001-2003) for which logbook data was available. The 4-day time limit was used to separate trips believed to target large coastal sharks from trips that targeted other species and then finished off the trip with one or more sets for large coastal sharks. Using these criteria, 126 directed shark boats that produce 85% of the large coastal landings were identified.

Within the group of 126 vessels, they identify 47 core vessels that depend on large coastal sharks for at least half their total landings and landed 50,000lb whole weight large coastal sharks during the three-year period. These core vessels were used to standardize fishing power (defined as catch per set and catch per trip). Four classes of directed shark vessel were identified: Class I = <32ft, Class II = 32-41ft, Class III = 42-54ft, and Class IV = >54ft. 116 of the 126 boats were standardized to Class III (ten of the 126 lacked length information in the database), and estimated a large coastal shark catch-per-trip for a Class III vessel at 2270 pounds dressed weight.

During the three years covered by the database, 175 directed shark permitted vessels and 96 incidental shark permitted vessels reported landing some large or small coastal sharks. These landings included catches by gillnet and handline as well as bottom longline and pelagic longline. Seventy directed shark permitted vessels and 253 incidental permitted vessels made no shark landings, and represented latent effort that could participate in the fishery unless their permits are removed. Assuming this were done, and these boats cannot fish large coastal sharks, they estimated that a fleet size of about 20 Class III directed shark permitted vessels and 96 incidental shark permitted vessels would match available effort to catch the current TAC of 2.25 million pounds (the actual number of boats would need to be adjusted according to length during the buyout process). Fleet size could increase to about 50 boats under an increased TAC of 5 million pounds. The effect of increasing the trip limit could not be quantified, but the distribution of landings suggested that a 25% increase to 5000 pounds was unlikely to have a major impact.

Development of the Buyout Business Plan -

Louisiana State University. Keithly, W.R. *Business Plan for the Atlantic Shark Fishery*.

Commercial shark activities represent a single component of a multi-species, geographically dispersed fishing industry. It is plagued by many of the same problems facing numerous fisheries throughout the world. Many of the problems, such as overfished stocks and overfishing conditions, emanate from a severe mismatch between the available capital and amount of stock that can be taken in an efficient and sustainable basis.

As a result of this mismatch, some participants of the Atlantic shark fishery have asked that a buyback program be considered for the fishery. The Buyout Business Plan, based on available information, considers the viability of such a program and develops a “draft” plan for the purchasing of shark permits.

Buyouts within fisheries have historically been funded by one of two methods: industry financed loans or direct appropriations from the U.S. Congress. An appropriation does not require repayment, but policy documents from the NMFS suggests that the U.S. Congress is unlikely to fund future buybacks. The amount of an industry financed loan is based on the value of landings from the fishery and must be repaid (with interest) over a 20 year period. This suggests that if the total value of the fishery were to increase, the amount available for a buyback would also increase proportionately. Unfortunately, the current TAC of the shark fishery is estimated at a value of ~\$5,000,000; a value that represents a small loan amount for an industry funded buyback. If vessels were to be included in the buyback options, the effectiveness of the program would be reduced (only a few vessels would be removed from the fishery). Hence, the Buyout Business Plan focused on the removal of permits.

While there appears to be a myriad of problems associated with development of a viable buyback program, the largest obstacle by far reflects the exceedingly large amount of latent and underutilized capacity in the fishery. While this capacity can, in theory, be removed via a buyback program, such efforts would be a wasteful use of funds and not reduce the size of the active fishing fleet (those actively fishing for shark on an annual basis). An option, therefore, is to make a direct request to the Secretary of Commerce that he take whatever actions are required to revoke unused or (substantially) underutilized capital (i.e., shark permits that are idle or rarely used).

Other concerns also exist regarding the viability of a buyback of shark permits. As discussed in this report, some states have regulations that are not completely compatible with federal regulations regarding the harvest and sale of shark. Likewise, the recreational component of the shark industry, which is sizeable, is not subject to a limited access system. Incompatibility of regulations and lack of a recreational limited access program suggest that some benefits that might otherwise be forthcoming from a buyback program, may well be eroded.

The issues of capital stuffing by post-buyback participants is also well recognized problem which can, over time, erode benefits initially gained from a buyback program. The Atlantic shark industry needs to carefully examine whether this issue is problematic before undertaking a program which it will be taxed for up to twenty years.

Finally, while this report focused almost exclusively on a buyback of permits, the industry may wish to consider a more “all inclusive” buyback program. Without going into detail, it is obvious that the amount of capital removed is directly related to the inclusiveness of the program. While an “all inclusive” program would, of course, require considerable coordination among many management councils and other agencies, such coordination may yield significant long-term benefits. However, these benefits must be weighed against a potentially long delay in implementing such a program.

Industry Mailings –

Of the 541 survey packages mailed, 74 comment sheets were returned (13.9% return rate). Twenty-four (24) of the survey packages were undelivered and subsequently returned to the Foundation’s office (4.4% undeliverable). Returned packages were from the states of Louisiana (13), Florida (7), South Carolina

(2), New York (1) and New Jersey (1). Of the returned packages from Louisiana, many were from or near the New Orleans area. Considering the impact of hurricanes Katrina and Rita, responses from Louisiana fishermen could be under represented.

Comments received by industry members supported each option included in the Business Plan with the exception of the option that would compensate fishermen \$2,000 for a directed permit and “buy down” to an incidental shark permit. Overwhelmingly, the majority of industry comments supported the “None of the above” (e.g., “no action”) alternative (Table 1).

Option	No. of Industry Responses	% of Total Responses
Receive \$500 for an incidental permit and give up future rights to fish for shark.	4	5.4%
Receive \$2,500 for a directed permit and give up future rights to fish for shark	1	1.4%
Receive \$2,000 and be permitted to "buy down" to an incidental shark permit	0	0.0%
"Blind, silent reverse auction"	4	5.4%
None of the above	65	87.8%

Table 1: Options included in the Business Buyout Plan and industry responses. Total number of responses equal 74.

Of those that preferred the “None of the above” alternative, some provided additional hand written comments. Generally, fishermen expanded on their attitudes surrounding the buyback, options included in the Buyout Business Plan, and alternatives that were not considered. Most respondents were critical of the project and the amount of compensation being proposed for a shark permit. In addition to written responses from the survey package, the Foundation’s Program Director fielded 6 calls from industry members inquiring about the buyback program. From these telephone conversations, it was apparent that industry members were confused about the development of the Buyout Business Plan and why specific options were included.

VII. Evaluation

All objectives for this award were completed. Contractors performed a series of research projects that provided detailed analyses of the Atlantic United States commercial shark fishery. These analyses allowed for the development of a Buyout Business Plan aimed at reducing capitalization within the fishery, while increasing profits to those individuals who stay in the fishery (assuming no significant regulatory changes).

While the proposed focus of the project shifted away from a buyout of vessels and permits, to a buyout of permits only, a “Blind, silent reverse auction” option was included in the Buyout Business Plan to allow

for more options in the types of capitalization that could be removed during a buyback process (e.g., shark permits, all fishing permits, vessel, and/or vessel and permits).

Shark fishermen did not significantly support any of the options included in the Draft Buyout Business Plan, and most survey respondents supported the “None of the above” (“no action”) alternative (87.8%). These results were expected. Prior to mailing the Buyout Business Plan survey packages, industry cooperators hypothesized that the Buyout Business Plan would be rejected due to low compensation rates being offered for shark permits. Industry cooperators asserted that directed shark fishing permits sold for \$7,500-\$12,000 on the open market with no history of landings. This claim was substantiated by Larkin and Adams (2005) and their summary of past transactions by currently active directed and incidental shark permits. Analyses indicated that the average transfer price for a directed shark permit was \$5,950, while a permit owner’s willing-to-accept price (as reflected in published personal advertisements) for a directed shark permit was \$9,500-\$15,000. When comparing these rates to the compensation being offered in the Buyout Business Plan (\$500-\$2,500), it is obvious why fishermen rejected these options; hand written comments from fishermen on survey sheets also reflected this point.

It is interesting to note that in the survey conducted by Larkin and Adams (2005) price ranges for permits ranged from \$500 for permits that had not been associated with landing any species (not just sharks) during 2001-2003 up to \$20,000 for permits that reported the highest average landings of shark during that period. A positive response was received across all categories, but was highest for those with higher landings. This suggests a speculative behavior on the part of latent permit holders and that a buyout for permits restricted to those that have landed shark could lure some to relinquish their fishing rights.

If it was expected that fishermen would reject the options included in the Buyout Business Plan, then why put those options in the Plan at all? Keithly (2005) and Larkin and Adams (2005) provide a detailed explanation. Briefly, the revenues generated by the total allowable catch of the shark fishery are too low to support an industry financed government buyback loan that would remove a significant amount of capitalization. In an example used by Larkin and Adams (2005) utilizing 2001 catch statistics, the total ex-vessel gross revenues of Atlantic shark fisheries were valued at approximately \$3 million. These landings would only support a loan of about \$1.87 million assuming a 4% U.S. Treasury annual interest rate. Utilizing a proposed vessel value assumed by the commercial shark fishing industry of \$5,000 per linear foot, a \$1.87 million industry financed loan would only remove 7 vessels during a buyback (assuming a vessel of 40 to 60ft). While there are many underlying assumptions associated with this example, when taking into account the total number of participants in the shark fishery (both incidental and directed fishing permits), clearly, an industry financed buyback focusing on the removal of vessels would be an exercise in futility.

Response rates to the options included in the Buyout Business Plan were markedly different (13.9%) than response rates attained by Jepson (2005) and Larkin and Adams (2005) (58.3%) during this project. Although a comparison of these surveys is impractical, the pool of respondents for each survey was approximately the same (541 vs. 551). Why the difference in response rates? Upon dissemination of the Buyout Business Plan survey package, industry cooperators conveyed that some fishermen discarded the survey package after a brief review of the options included in the Buyout Business Plan. From this information, it is thought that response rate could be correlated with the perceived “feasibility” of the options included in the Buyout Business Plan. For example, if more fishermen perceived the options in the Buyout Business Plan to be a financial benefit, then one would expect an increased response rate. Building on this idea, one is lead to believe that the options were not fully understood (e.g., “Blind, silent reverse auction”) or perceived as “unfeasible”.

Another factor that could have affected survey response rate is the number of surveys targeting the same sample population and the timing of surveys. Within one twelve month period, three surveys were

conducted that focused on commercial shark fishermen: two for this project and one through Duke University. The surveys conducted by Duke University and Jepson (2005), Larkin and Adams (2005) were conducted within a relatively short period of time (several months). The industry survey soliciting comments on the Buyout Business Plan was conducted about 12 months later. It is possible that fishermen became disinterested in replying on the options included in the Buyout Business Plan.

While fishermen did not accept the options included in the Buyout Business Plan, data suggests that the majority of shark fishermen are interested in a buyout (Jepson 2005; Larkin and Adams 2005). Considering the National goal of a 25% reduction in fishing capacity by 2009 for all federally managed fisheries (NMFS 2004), a buyout within the shark fishery is still likely, but several significant impediments must first be addressed (regulations, reduction or elimination of latent effort, identification of alternative funding sources for a buyout, and the inclusion of more feasible options in the Buyout Business Plan).

Of significance to fisheries managers and shark fishermen, is the apparent lack of funds generated by the commercial shark fishery to finance a buyback that would substantially reduce capacity. This would indicate that either a more comprehensive buyout is necessary, one that includes other fisheries in which shark fishermen participate, and/or latent effort would need to be severely restricted or eliminated to increase the effectiveness of the buyback.

No recommendations are presented on how to mitigate the adverse impacts of a buyout within the commercial shark fishery. This can be attributed largely to the underlying assumptions that were implicit with each of the contractor's projects. While this overall program did describe and highlight the nuances of the fishery and willingness of fishermen to participate in a buyout, specific research highlighting how commercial fishing economies and enterprises incorporate into larger community economies and cultures (Jepson 2005) is necessary (this was not an objective included in this program). This insightful socio-economic research would then need to be reviewed by regulators to address concerns revolving around latent effort. Without these issues resolved, a formal buyback structure cannot be defined, hence adverse socio-economic impacts cannot be mitigated.

Data from the SEDAR-11 workshops (Large Coastal Sharks) might further complicate problems associated with a buyout. The final SEDAR-11 LCS Stock Assessment Report (NMFS 2006) and the Consensus Summary Report (Payne 2006) indicate that sandbar sharks are overfished and that overfishing is occurring. Sandbar sharks account for roughly one-half of large coastal shark landings on an annual basis (Hester *et al.* 2005; NMFS 2006; personal communication, Russell Hudson, Directed Shark Fisheries, Inc.). Although implementation of revised management measures will likely not occur until 2008 (personal communication, Karyl Brewster-Geisz, HMS Office, NMFS), the Magnuson-Steven Act requires NMFS to prevent overfishing and rebuild overfished stocks. This mandate is expected to result in a lowered TAC for large coastal sharks.

When quota adjustments are implemented, fishermen will continue to target shark stocks during the open season. However, the shark stock will be harvested in a shorter duration during the open season (i.e., the season will be reduced). Two possible scenarios are likely to result, each with a corresponding effect on the commercial fishery. Once the trimester shark fishing quota is filled, fishermen will be forced to shift their fishing effort to other fisheries, not normally targeted by shark fishermen, to remain profitable. This places a potentially undue burden on the newly fished stock. If fishermen cannot successfully transition to a new fishery and remain profitable, the second scenario could be encountered, the creation of a part-time fisher or early retirement of a fisher. Data from Hester *et al.* (2005) and Larkin and Adams (2005) suggests that vessels with smaller gross revenues will be most affected by a lowered TAC due to the increased dependence of these entities on shark stocks as a source of income.

If the TAC for the shark fishery is further reduced, the potential of an industry financed buyback within the shark fishery can be considered a financially impractical possibility unless a more comprehensive buyout program was considered. Increasing the number of fisheries involved in a buyback increases the complexity of the program and places more burden on other fisheries, besides that of shark, to pay back the industry financed loan. To be effective at reducing capital within the fishery, shark fishermen and fishery managers should explore financing alternatives outside of an industry financed program. This would include government (Congressional Appropriation) or private/public (charitable trusts, foundations, philanthropists) finance programs.

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